International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Impact Factor (2012): 3.358

Toxic Effect of Organochlorine (Quinalphose) on Erthworms, *Essenia Foetida*, by Using Filter Paper Contact Test Method

Ahmad Shahezad[1], S. S. Pawar[2]

[1]Government Vidarbha Institute of Science and Humanities, Amravati-444604 (MS) India

[2]Government Institute of Forensic Science, Nagpur-440001 (MS) India

Abstract: ***Organochlorine (Quinalphose) has been used in agriculture for killing insect which is very poisonous and targeted to non targeted animals like earthworms. In the present study, we investigated the mortality of Organochlorine on the species of Earthworm, Eisenia foetida. The LC50 values will be calculated and it was shown that 150µl/850µl of Organochlorine concentration was showing 50% mortality. This mortality compared with the control. This test will show Organocholorine was poisonous for earthworms. We have observed in the test of Organochlorine using the of filter contact test it has been shown affect on earthworm body. The body was folded and very less active after 48 hrs. Periods of test concentration.***

Keywords: Earthworms, Organochlorine (Quinalphose), LC50, plastic box, filter paper etc.

1. Introduction

The Earthworms are the farmer's friendliest. They have passed on an important purpose in farming. The land is fundamental to the diverse communities of microbes, plants, and invertebrate and vertebrate animals like Earthworms that comprise the terrestrial ecosystem, and it is significant to understand the effects and hazards of polluted soil sites in relation to these ecological receptors (Ann et al.,1999). The Organochlorine (Quinalphose) have been very toxic, it have been directly affected on non target animal which is present in soil. Red worms are considered good because they assist in the decomposition of turf grass thatch and grass cuttings, which serves to recycle nutrients and organic matter into a lawn's soil. The tunneling and burrowing caused by earthworm activity provides a natural cultivation effect that is much more efficient than that experienced with mechanical core cultivation/aeration equipment. These tunnels help oxygen and water to enter the turf root zone more easily (Colorado State University Extension). Earthworms represent a large balance of biomass of terrestrial invertebrates (80%) and so they are suitable bio indicators of chemical contamination of the soil in terrestrial ecosystems providing an early warning of deterioration in land quality (Bustos et, 2002; Culy et, 1995;, Shahla et 2010; Sorour and Larink, 2001). Surveys hold demonstrated that earthworm skin is a significant route of contaminant uptake (Shahla et 2010; Lord et., 1980) and thus investigation of earthworm biomarkers in the ecological risk assessment can be helpful (Shahla et, 2010; Sanchez-henandez, 2006).

2. Material and Method

1) Animals- Earthworm (*Eisenia foetida*) bought from commercial suppliers, Nursery Department of Forest, Amravati. This species were reared in the laboratory and adopted as the test species, recommended species by OECD (1984) guideline for testing of chemicals no. 207, earthworm, acute toxicity tests. We were used adult earthworm which is having above 250- 300mg of body weight.
2) Chemical- We were selected Quinalphose (Organochlorine) as test chemical purchase from the agriculture market of Amravati. This test chemical diluted in 0.5µl in 100ml of distilled water.
3) Acute toxicity test -Acute toxicity test was performed following the method described in the OECD (1984) guideline for testing of chemicals no. 207. This is a simple screening test to identify the toxic potential of the chemical to an earthworm. The test vials were a plastic round box which was transparent of 14cm diameter and 2cm height. Round filter papers (What man No. 1) were cut to the suitable size and located in such a manner that all sides were lined with filter paper. 0.5ml in 100ml distilled water test solution was prepared and make up the volume of test solution from 30µl to 300µl of Quinalphose in 1ml of distilled water. From this prepared test solution 1ml sprayed to each 10 filter paper and went on this filter paper in 10 round plastic box. One blank test was prepared with 1ml of deionized water and applied as a command. For each treatment, 11 replicates were used, each consisting of one earthworm per vial. Adult earthworms, which possessed clitellum and had an individual wet weight of 250–350mg, were selected for testing. Earthworms were washed briefly with deionized water, and were kept on moist filter paper for 3h to devoid the gut content, after which it was rinsed again with deionized water, blotted on the filter paper and placed in a test vial. An earthworm was introduced per vial and the vial was covered with plastic film that had been plugged with small holes using needles. Trials were made out in the dark at 28±2 0C for 48 h. After 48 hours the earthworm was monitored for mortality by a gentle mechanical stimulus to the front office.
4) Statistical analysis- For the filter paper contact test method, based along the resulting 48h LC 50 values, the fertilizer will be classified as supertoxic (<300 µl /700 µl), extremely toxic (240 µl – 270 µl /5ml), very toxic

(120 µl – 180 µl /5ml), relatively nontoxic (>150 µl /5ml) [8].

3. Results and Discussion

Quinalphose (Organochlorine) is pesticide and it is very vicious. We have estimated the mortality of Organochlorine by using a filter paper contact test. We were looking into the mortality of cannabis is 150µl/850µl concentration with detailed water (table 1).

Observation Table 1

Quinalphose	D/W	Volume of test sol^n	Set 1	Set 2	Set 3	Mean for LC_{50} Result
30µl	970 µl	1ml	Live	Live	Live	
60µl	940 µl	1ml	Live	Live	Live	
90µl	910 µl	1ml	Live	Live	Live	
120µl	880 µl	1ml	Live	Die	Live	
150µl	850 µl	1ml	Die	Live	Die	150 µl/850 µl D/W
180µl	820 µl	1ml	Live	Live	Live	
210µl	790 µl	1ml	Die	Die	Die	
240µl	760 µl	1ml	Die	Die	Die	
270µl	730 µl	1ml	Die	Die	Die	
300µl	700 µl	1ml	Die	Die	Die	

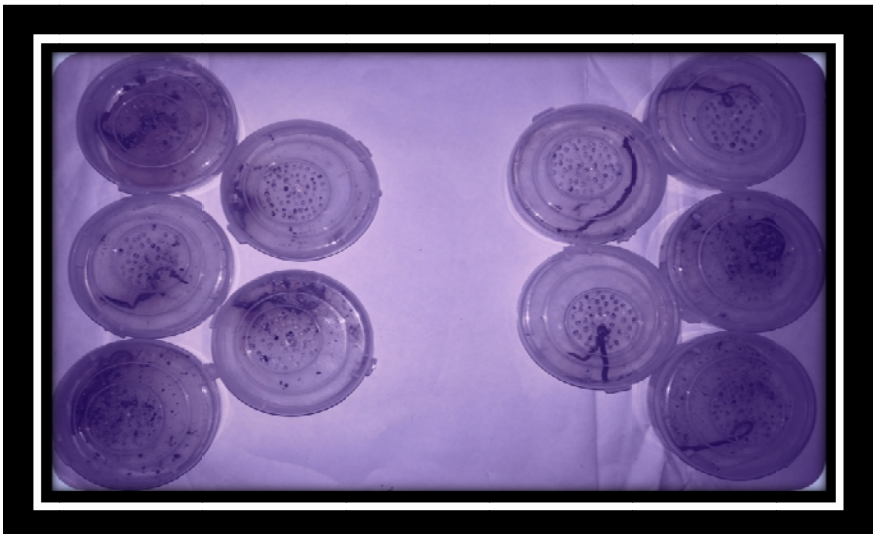

Figure 1

We were using 10 different concentrations of organochlorine 30µl to 300µl. And we were seeing them some earthworm has been going in the 150µl above concentration of Quinalphose (table 1). 30µl to 90µl concentration was less effect on earthworm they have been dynamic and acting close to the plastic vials.

In the 120µl to 150µl was also affected from. They accept been involved in the earthworm's body. The consistency has been folded and less dynamic and some marks are present in the physical structure of earthworms (table 1). They have been compared with control (fig-1).

In the concentration of 180µl to 240µl was very effected on earthworm body. The body of an earthworm was folding and died and some part of body of earthworms was broken down (fig 1) (table 1).

In the concentration above 240µl to 300µl is super toxic which affect on earthworm is. The earthworms have been melting and died. And tail region of earthworm has been developed (fig 1) (table 1).

4. Future Scope

This inquiry has been an important for agriculture the earthworm is an intestine of earth. The consequences should be shown the impact of pesticide on the crawler. And it will be made an informative data about the toxicology of Organoclorine.

References

[1] BUSTOS-OBREGÓN, E., GOICOCHEA, R.I., 2002 – Pesticide soil contamination, mainly affects earthworm male reproductive parameters. Asian Journal of Andrology 4(3) 195
[2] BOOTH, L.H., HODGE, S, O'HALLORAN, K., 2001– Use of biomarkers in earthworms to detect use and abuse of field applications of a model organophosphate pesticide. Bull. Environ. Contam. Toxicol. 67: 633–640; .
[3] BOOTH, L.H., O'HALLORAN, K., 2001 – A comparison of biomarker responses in the earthworm Aporrectodea caliginosa to the organophosphorous insecticides Diazinon and Chlorpyrifos. Environ. Toxicol. Chem., 20, 2494-2502
[4] OECD GUIDELINE FOR TESTING OF CHEMICALS - Earthworm, Acute Toxicity Tests, 1984, April 4 (http://www.oecd.org);
[5] Sanchez-Hernandez, J.C., 2006 - Earthworm biomarkers in ecological risk assessment. Reviews of Environmental Contamination and Toxicology. 188: 85–126
[6] SHAHLA, Y., D'SOUZA, D., 2010 – Effects of pesticides on the growth and reproduction of earthworm. Applied and Environmental Soil Science. 2010(2010): 1-9;

[7] Walli, R. K., Singh, R., Dudeja, P. K., Sarkar, A. K. And Mahmood, A. 1984. Subchronic Malathion treatment effects on rat intestinal functions. Bull. Environ. Contam. Toxicol. 33: 289-294.
[8] Yasmin, S. And Souza, D. D. 2007. Effect of pesticides on reproductive output of Eisenia foetida. Bull. Env. Contam. Toxicol. 79: 592-532.

Author Profile

Ahmad Shahezad is a Research Student, Department of Zoology, Government Vidarbha Institute Science and humanities . He has done B. Sc, M.Sc(Zoology) from Vidya Bharti Mhavidiya Amravati, B.Ed from Nagpur, Maharashtra, India. He is specialized physiology. Presently he is working as a CHB Teacher in Govt. Vidharbha institute of science and Humanities, Amravati, Maharashtra, India

Dr. Santosh Shivlal Pawar is Associate Professor in Zoology, Department of forensic Science, Government Institute of Forensic Science, R.T Road, Civil Lines, Nagpur, Maharashtra, India. He has done B. Sc. M.Sc, and Ph.D in Zoology form Govt. Vidarbha Institute of Science and Humanities, Amravati, Maharashtra, India. He has Teaching Experience of 11 years. Presently he is working in Government Institute of Forensic Science, Nagpur, Maharashtra, India. His research interests include Biodiversity, Toxicology, Population Genetics.